



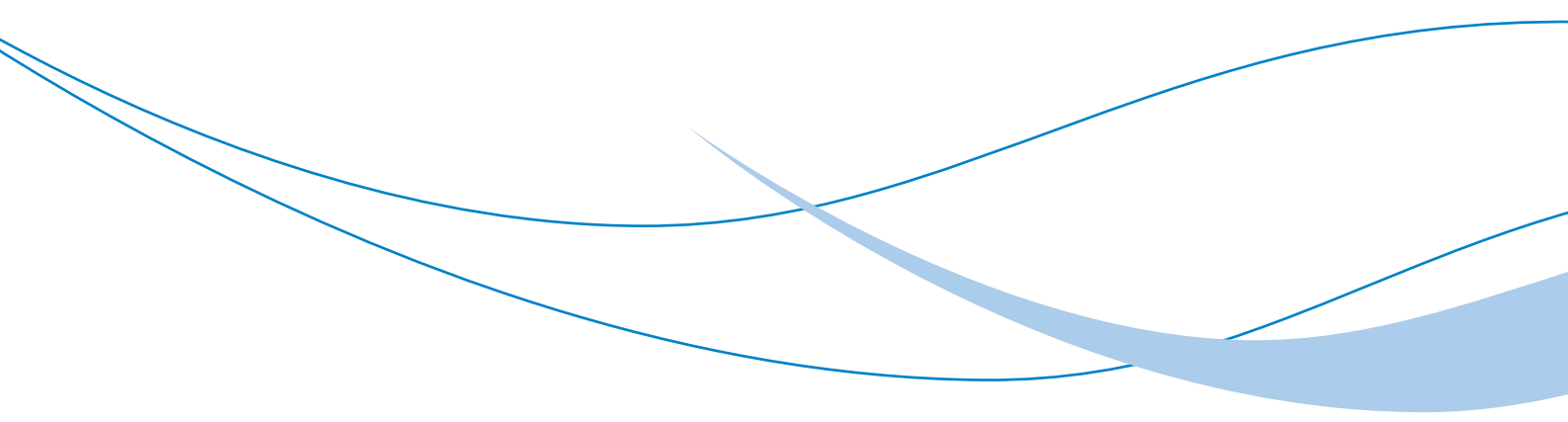
**Water**  
*Service*

## Drinking Water Quality Annual Report 2006



An Agency within the Department for  
**Regional  
Development**  
[www.drdni.gov.uk](http://www.drdni.gov.uk)





***Title:***

Drinking Water Quality Report 2006

***Editor:***

Gareth Maxwell

***Published by:***

Northern Ireland Water

Printed June 2007

Published to meet the requirements of the  
Water Supply (Water Quality) Regulations (NI) 2002

***Publisher:***  
Water Service  
Northland House, 3 Frederick Street  
Belfast BT1 2NR

***Edition:***  
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ISBN 978-1-904807-15-5

## Foreword

This is Water Service's Annual Drinking Water Quality report covering the calendar year 2006. This is our third annual report on the quality of drinking water in Northern Ireland since new regulations came into force in January 2004, and the last to be produced under the auspices of Water Service. These regulations implement the requirements of the European Drinking Water Directive and set tighter standards for drinking water quality.

I am pleased to report further improvements in water quality. In 2006, 99.34% of tests assessing Mean Zonal Compliance (MZC) met these strict regulatory standards – an improvement from 99.02% MZC in 2005 (see table on page 5). This was achieved through our continuing investment in new

and improved assets and equipment, rigorous management of our water sources, treatment and supply systems and through the commitment and dedication of Water Service employees.

However, our water quality is still behind the equivalent level in the rest of the UK, which our capital investment programme 2007-2010 is designed to remedy. We have committed to investing £174m by 2010 in water treatment, storage and mains improvements, together with a £110m Public Private Partnership programme to further improve drinking water compliance with EU drinking water standards.

I hope you find this report informative and interesting, and as we move to become Northern Ireland Water, that you will be assured of our ongoing

commitment to maintaining and advancing the quality of the drinking water delivered to our customers throughout Northern Ireland.

*K. Bryan*

**Katharine Bryan**  
Chief Executive



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A photograph of a young child in a red shirt drinking from a glass. In the foreground, an adult's hand is pouring water from a clear glass pitcher into another glass. The background is a bright, out-of-focus indoor setting.



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## Introduction

Water Service is an Executive Agency within the Department for Regional Development, and from the 1st April 2007 Water Service becomes a government owned company known as Northern Ireland Water with the Department for Regional Development its sole shareholder. Water supplied for domestic or food production purposes, must meet the standards contained in “The Water Supply (Water Quality) Regulations (Northern Ireland) 2002”. The Department for Regional Development is responsible under the Water and Sewerage Services

(Northern Ireland) Order 1973 to supply and distribute water, and Water Service performs the Department’s water supply functions.

Water is regularly monitored and tested for quality. This report summarises Water Service’s regulatory results from 1 January 2006 to 31 December 2006. During this reporting period, 99.34% of all tests carried out on samples taken from customers’ taps and authorised supply points, complied with the regulatory standards assessed using Mean Zonal Compliance (MZC).

Water Service aims to provide high quality drinking water, in a cost effective manner, to meet the requirements of existing and future customers and, thereby, contribute to the health and well being of the community and the protection of the environment.

Water Service continues to meet the obligations placed upon it to comply with regulatory standards and the heightened demands from customers’ expectations. Investing in the extension and upgrading of water treatment works remains a high priority and the current programme is detailed in Appendix 4.





A higher percentage of the Northern Ireland population, as compared to Great Britain, live in rural areas. As a result there is a greater length of watermain per head of population connected to the public supply. The average length of watermain per head of population served in Northern Ireland is estimated at 15.4 metres as compared to 6.2 metres in England and Wales, and 9.0 metres in Scotland. This means that Water Service's ongoing mains rehabilitation programme to restore or replace the existing water mains pipework requires more investment than the comparable process in Great Britain.

To assist in understanding the contents of this report, a glossary of technical terms is provided (Appendix 5).

# Drinking Water Quality Summary – Year on Year



**Compliance assessed against the  
“Water Supply (Water Quality) Regulations (Northern Ireland) 2002”**

Reporting Year	2004	2005	2006
<b>Mean Zonal Compliance (i)</b> (average water quality at customer tap at parameter level)	<b>98.65%</b>	<b>99.02%</b>	<b>99.34%</b>
<b>Customer Tap / Supply Point Water Quality (ii)</b> (not including Authorised Departures and including total coliforms)	<b>98.63%</b>	<b>99.19%</b>	<b>99.42%</b>
<b>Customer Tap / Supply Point Water Quality (ii)</b> (including Authorised Departures and including total coliforms)	<b>99.63%</b>	<b>99.73%</b>	<b>99.66%</b>
<b>Service Reservoirs Water Quality</b>	<b>99.81%</b>	<b>99.71%</b>	<b>99.79%</b>
<b>Water Treatment Works Water Quality</b>	<b>99.83%</b>	<b>99.89%</b>	<b>99.90%</b>
<b>Overall Quality (including Authorised Departures)</b>	<b>99.72%</b>	<b>99.75%</b>	<b>99.75%</b>

**Notes**

- (i) Mean Zonal Compliance (MZC) – method of assessment used across the UK, and supported by the Drinking Water Inspectorate as an industry comparator.
- (ii) Previous methods of compliance calculation, being phased out after 2007. Included for transitional information during transfer to MZC assessment.

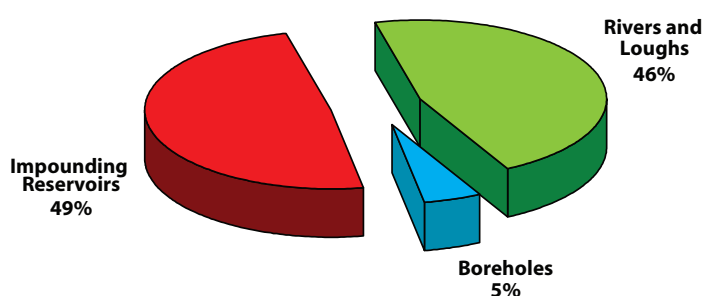
### Sufficiency of Supply

Approximately 795,000 domestic, agricultural, commercial and business properties in Northern Ireland are connected to the public water supply. Each day during the year we supplied some 619 million litres of high quality drinking water to customers. Water Service operates approximately 57 sources which include upland Impounding Reservoirs, Boreholes, Rivers and Loughs. Effective planning for the sufficiency of future water supplies is essential.

Water Service, through its Water Resource Strategy, plans to ensure that demand for drinking water is met for the period up to 2030. The strategy emphasises the need to rationalise existing uneconomic water sources and concentrate on the sources that can meet our needs cost-effectively and reliably.

Water supplies in Northern Ireland are obtained from three types of source, as shown: -

### Water Sources



### Leakage

Water Service currently has a Water Efficiency Plan with an associated Leakline number: -

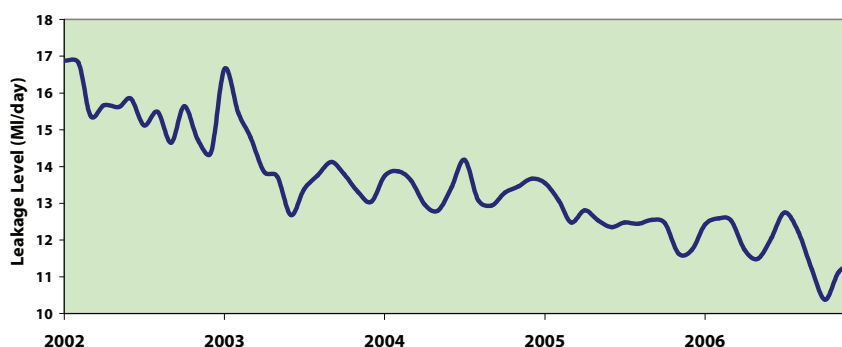
**(Freephone) 08000 282 011**

The Leakline number allows customers to report leaks on roads and footpaths at no cost to themselves and Water Service is

committed to the prompt investigation and repair of any leaks.

The plan aims to implement and promote a range of water conservation measures that can be employed by both Water Service and its customers. The graph demonstrates the ongoing effectiveness of this plan.

### Leakage Level Improvements



### Water Safety Plans

A Water Safety Plan (WSP) is the most effective way of ensuring that a water supply is safe for human consumption and that it meets the health based standards and other regulatory requirements. It is based on a comprehensive risk assessment and risk management approach to all the steps in a water supply chain from catchment to consumer.

The primary objectives of a water safety plan in protecting human health and ensuring good water supply practice are the minimisation of contamination of source waters and effective treatment using appropriate processes. The majority of the regulatory requirements are monitored at the customer tap thereby ensuring the quality of the product at the point where customer.

The Water Industry has adopted the WSP approach to risk management from raw water source, through water treatment and to our customer's taps. As the first steps towards complete WSPs, Water Service has put in place systems to identify hazards which could potentially threaten each stage of water supply from catchment to consumer. These include a comprehensive catchment management plan, liaison with the Environment and Heritage Service (EHS), raw water monitoring and the completion of "Tests of Likely Significance" studies and subsequent attainment of Abstraction Licences for our raw

waters. We have in place a system of audits and procedures to effectively deal with risks associated with treatment at our water treatment works.

Water Service has a well established Environmental Management System certified to ISO 14001. In terms of its distribution system, it is progressing with a comprehensive Mains Rehabilitation Programme with a view to upgrading an ageing distribution system of drinking water mains. Water Service has a monitoring programme in place which covers raw waters, water at various treatment stages, drinking water in distribution and at customer tap. Water Service liaises with its customers on a wide variety of issues and where there is an exceedance of a regulatory parameter, investigations and remedial work is carried out to ensure that drinking water is regulatory compliant. Where the monitoring programme highlights a problem with customer plumbing, Water Service informs the customer, the local Environmental Health Officer and the Drinking Water Inspectorate.

### Authorised Departures (ADs)

Authorised Departures (ADs) from standards in Northern Ireland are authorised and administered by the Department of the Environment's Drinking Water Inspectorate (DWI) with the agreement of the Health Authorities. The standards that have been relaxed are for Aluminium and Total Trihalomethanes and apply to

the water supplied to the Water Supply Zones listed in Appendix 2. These named Zones are supplied from Water Treatment Works that have an agreed fixed programme of works intended to make them fully compliant with the regulations.

### Mean Zonal Compliance (MZC)

Following the introduction of "The Water Supply (Water Quality) Regulations (Northern Ireland) 2002", assessment of the quality of water supplied to Water Service's customers are also monitored using "Mean Zonal Compliance". This provides the information to establish new baselines, in common with the rest of the United Kingdom, to assess water quality at a parameter level over the forthcoming years. It is based on water supply zones, the essential building blocks of Water Service's sampling programme. This level of reporting provides transparency as to where improvement measures are required to achieve compliance with the drinking water quality standards.

Mean Zonal Compliance introduces a consistent method of reporting across the UK and is supported by the Drinking Water Inspectorate as an industry comparator allowing direct comparisons of results.

The traditional method has also been used in this report, but in the future Mean Zonal Compliance will be the main method of assessing compliance.



# Drinking Water Quality Standards

***Drinking Water Quality in Northern Ireland is assessed against standards set in the Water Supply (Water Quality) Regulations (Northern Ireland) 2002.***

The Water Supply (Water Quality) Regulations (Northern Ireland) 2002 (the "Regulations") fully incorporate the requirements of the European Commission's Drinking Water Directive 98/83/EC (the "Directive") relating to the quality of water intended for human consumption and, for certain parameters, more stringent UK national standards.

The Regulations set out the requirements to be met by Water Service when supplying water for domestic or food production purposes and include:-

- water quality standards for wholesomeness;
- sampling locations for monitoring purposes;
- minimum requirements for the number, frequency and types of water samples to be taken at


- sampling locations;
- water sample collection and testing regimes;
- maintaining records of water sample results; and
- provision and publication of information

Water Service assesses standards for water quality against the parameters as listed in Appendix 1. The standards in the Regulations are normally expressed as 'Prescribed Concentrations or Values' (PCV) and are generally specified as maximum, minimum, percentile or average concentrations for a particular substance. Standards are set to ensure that water is safe to drink and aesthetically acceptable.

The Directive and the Regulations permit standards to be relaxed in certain specified circumstances provided there is no risk to public health under a process of "Authorised Departures". These allow a time limited Authorised Departure from the regulatory limit for certain parameters, provided

there is a planned programme of work at the Water Treatment Works to improve the water quality and there are no adverse health implications

The Regulations set demanding standards for the quality of drinking water but contraventions of these standards do not necessarily imply the water represents any public health risk. These contraventions are reported to the Drinking Water Inspectorate, investigated by Water Service, and prompt remedial action taken where appropriate.



# Drinking Water Inspectorate - Technical Audit

A Drinking Water Inspectorate (DWI), established within the Environment and Heritage Service Agency, has an independent responsibility to audit drinking water quality compliance against the standards set in the Regulations.

Each year DWI undertakes a technical audit of the measures taken by Water Service to comply with the Regulations. The technical audit process includes:

- the transfer, to DWI, of analytical results of samples taken throughout the year, from water treatment works, service reservoirs and customers' taps;
- a compliance assessment of this information against the regulatory standards; and
- carrying out an inspection programme which examines the sampling, analytical, reporting, water treatment, distribution policies and relevant procedures

In 2006, the technical audit inspection programme included:

- evaluation and implementation of strategies to meet new regulatory requirements;
- audit of seven service reservoirs (Altaveedan, Ballyveagh Low, Dundrinne, Finvoy, Kilhoyle, Mill Road and Tullybrannigan High);
- audits of Brishey and Stradreagh Water Treatment Works (full audits);
- audits of Ballinrees and Carmoney Water Treatment Works (post-incident analysis);
- two analytical laboratory audits (Altnagelvin and Westland House);
- two sampling audits (Altnagelvin and Westland House);
- the Laboratory Information Management System (LIMS) Audit (Northland House);
- an audit of procedures and practices used within the mains rehabilitation programme;
- a *Cryptosporidium* risk assessment and monitoring review; and
- progress reporting on agreed follow-up action including non-trivial parameter contraventions, previous inspections and post incident analysis

DWI made a number of recommendations and suggestions and Water Service has followed up on these issues. DWI will report on the inspections and the quality of water supplied by Water Service in its annual report, due to be published later in the year. DWI is located at Klondyke Building, Cromac Avenue, Gasworks Business Park, Lower Ormeau Road, Belfast BT7 2JA.

## Incidents

In addition to DWI's audit of drinking water quality, DWI requires that it be notified whenever an incident or event occurs that has the potential to impact on drinking water quality. After investigation these may prove not to have had a detrimental effect on water quality and are classified in the "Drinking Water Inspector's Report" as "events" as opposed to "incidents".



During 2006, there were 13 notifiable incidents and 5 events.

#### Water Quality Incidents and Events

Date	Location	Nature of Incident / Event	Classification
March	Moyola WTWs	Treatment failure causing deterioration in water quality.	INCIDENT
March	Drummaroad WTWs	Treatment failure resulting in Aluminium failures in distribution.	INCIDENT
May	Derg WTWs	Precautionary shut down of works due to oil spillage on River Derg.	EVENT
June	Layde SR	'Boil notice' issued – coliform exceedances.	INCIDENT
July	Cookstown & Dungannon area	'Boil notice' issued – total and faecal coliform exceedances in Orritor SR supply area.	INCIDENT
July	Carron Hill WTWs	Operational problems - high manganese and turbidity levels in final water.	INCIDENT
July	Portglenone area	'Boil notice' issued – 3 consecutive days bacteriological exceedances.	INCIDENT
July	Glarryford area	'Boil notice' issued to four properties – total and faecal coliform exceedances.	INCIDENT
August	Bridge Street, Ballymena	'Boil notice' issued to single property – total and faecal coliform exceedances.	EVENT
August	Killymuck Road, Kilrea	'Boil notice' issued to three properties – coliform exceedances.	INCIDENT

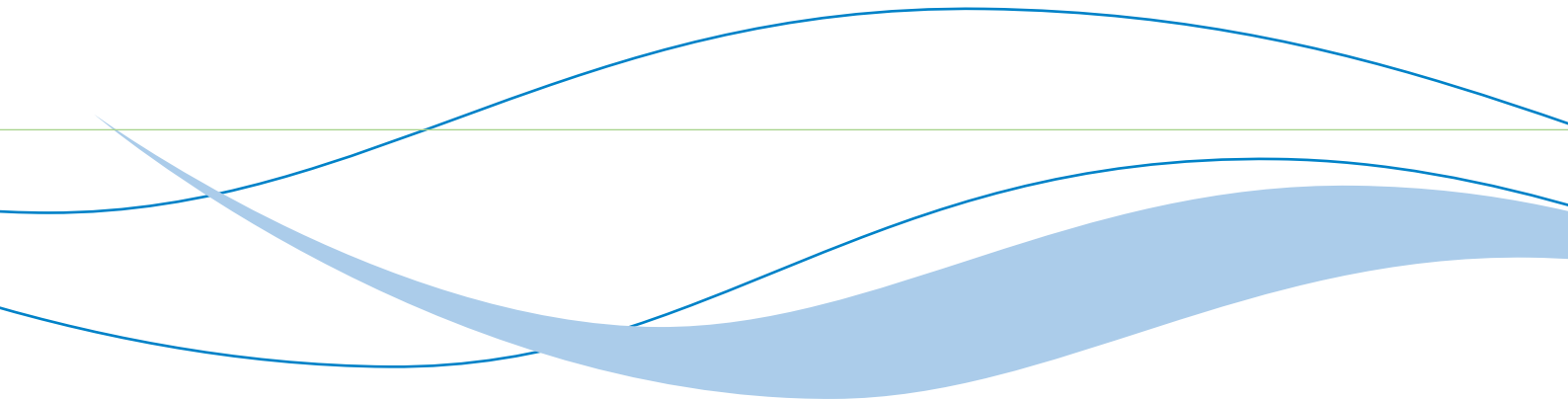




Date	Location	Nature of Incident / Event	Classification
August	Lough Fea WTWs	High aluminium and iron levels reported in final water sample.	EVENT
August	Dorisland WTWs	Chlorination failure at works resulting in total and faecal coliforms in final water.	INCIDENT
August	Forked Bridge WTWs	Chlorination failure at works resulting in total and faecal coliforms reported in final water sample.	EVENT
August/September	Seagahan WTWs	Recurring turbidity contraventions due to algal bloom.	INCIDENT
September	Moyola WTWs	Treatment problems caused by change in raw water quality led to high turbidity levels in works final water and iron and aluminium exceedances in distribution.	INCIDENT
September	Millbank Avenue, Portstewart	'Boil notice' issued to 415 properties - total and faecal coliform exceedances.	INCIDENT
October	Seagahan WTWs	Chlorination failure at works resulting in total and faecal coliforms in final water.	INCIDENT
December	Ballinrees WTWs	High turbidity result reported in final water.	EVENT

# Monitoring Drinking Water Quality





The Regulations necessitate a thorough and extensive water sampling programme to be undertaken, to monitor water quality throughout the supply and distribution systems. The sampling locations and frequencies for the monitoring of drinking water quality are specified in the Regulations. These are audited by the Drinking Water Inspectorate (DWI). The mandatory sampling programme requires water samples to be collected regularly at water treatment works, at service reservoirs and water towers used to store treated water and at customers' taps in the water supply zones.

Under the Regulations, samples to be analysed for parameters which do not change in the supply watermain may be collected from Authorised Supply Points. These samples are collected from the final distribution point of the Water Treatment Works, and are considered under the Regulations to be equivalent to samples collected from the customer tap. All samples are carefully collected, handled and transported to ensure

that they accurately represent the water quality which customers receive. Water Service employs skilled and experienced sampling staff for the collection and delivery of the regulatory samples to the laboratories. All sampling staff wear uniforms and carry identity cards when they call upon customers to take a sample.

Samples collected from customers' taps are taken randomly in each water supply zone. A water supply zone is a designated area of no more than 100,000 population supplied with water by one treatment works or blended water from several works. The number and boundaries of water supply zones are subject to change according to operational requirements, as supply sources to areas are adjusted to meet demand and infrastructure developments. On this basis 66 zones were monitored during the period of this report.

The parameters for which samples are tested include: -

- microbiological, e.g. Coliform bacteria
- physical, e.g. pH (Hydrogen Ion)
- chemical, e.g. Iron, Manganese, Lead and Nitrate
- aesthetic, e.g. Taste, Odour and Colour

Compliance with the drinking water standards is determined by comparing the results of laboratory analysis of water samples with the relevant parameter PCV. Where monitoring indicates that a standard has not been met, appropriate immediate investigation and remedial action is undertaken to ensure that the water supply does not present any public health risk. Sampling programmes are adjusted and increased testing may be scheduled in the water supply zone for the parameter involved. Water Service will at all times liaise with the DWI and the relevant Health Authorities to ensure customer safety.

# Quality Assurance



The Regulations require water quality to be monitored using analytical systems which can demonstrate that appropriate accuracy is achieved and maintained. Water Service attaches great importance to the integrity of the analysis and for this reason applies stringent laboratory analytical quality control procedures. These systems and procedures are subject to external inspection and audit by the Drinking Water Inspectorate and an assessment of Water Service's performance will be included in the Inspectorate's annual report.

Water Service has achieved the requirements of the Drinking Water Testing Specification, a national scheme agreed between the Drinking Water Inspectorate and the United Kingdom Accreditation Service for quality assurance within laboratories carrying out analysis for the water industry.

In addition to this, all Water Service Testing Laboratories have attained the necessary standard of analytical excellence and have been awarded UKAS accreditation. UKAS external auditors continuously monitor this accreditation.

The importance of rapid detection of *Cryptosporidium* oocysts has resulted in a *Cryptosporidium* Analytical Unit being established at the Altnagelvin Laboratory. This Unit has Drinking Water Inspectorate approval and is instrumental in the development of new accredited methods for the water industry.



# Water Quality Summary



### Water Service Sites in Service

During 2006, the numbers of Water Service sites in service were:

Location Type	Number in Service
Water Treatment Works	48
Service Reservoirs	355
Water Supply Zones	66
Authorised Supply Points (see glossary)	48

### Overall Water Quality

112,044 microbiological, physical and chemical tests were carried out for Schedule 1 (and zonal total coliforms) parameters on water samples taken from water treatment works, service reservoirs and customers' taps in the year 2006. 111,760 of these tests complied with the regulatory standards giving an overall percentage compliance of 99.75%.

### Microbiological Quality

Water leaving water treatment works is disinfected with chlorine to safeguard public health by destroying microorganisms. This is the most important part of the water treatment process and is monitored for effectiveness at water treatment works, service reservoirs and in the distribution system at customers' taps.

To ensure the wholesomeness of water supplied, treated water is regularly examined for total coliforms and faecal coliforms (E. coli). The presence of these organisms may indicate potential microbiological contamination of

water supplies, and if they are detected in drinking water, immediate action is taken to identify the source and to minimise any risk to public health.

Many instances of microbiological failure in samples taken from customers' taps are due to contamination of the tap itself, in particular with kitchen taps. For this reason if a positive result is obtained, investigations are immediately carried out to identify if the positive result is due to the specific tap or the general system.

A summary of the microbiological quality of water supplied in 2006 is given below.

### Water Leaving Treatment Works

9,704 samples were taken and

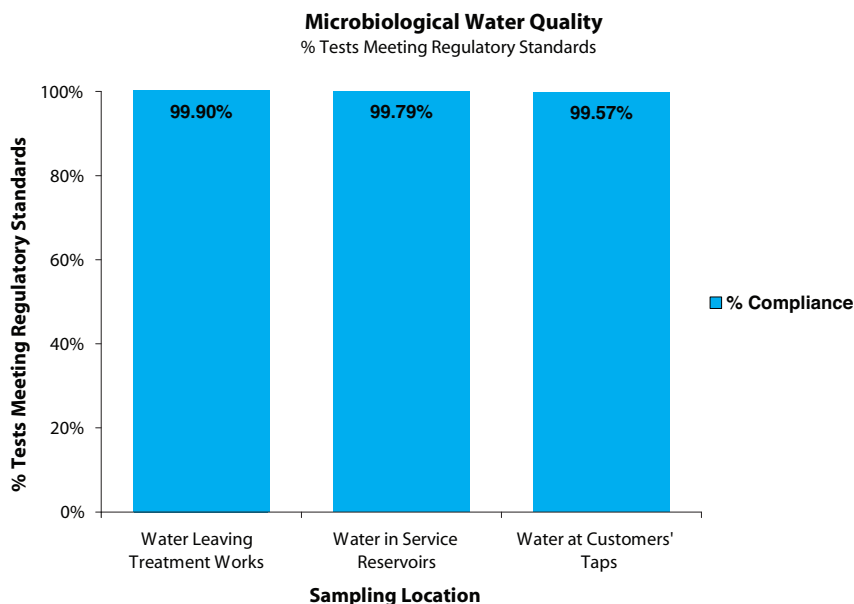
examined for coliforms. Of these, total coliforms were absent from 99.85% of samples and E. coli from 99.95%.

### Water in Service Reservoirs

17,914 samples were taken and examined for coliforms. Of these, total coliforms were absent from 99.62% of samples and E. coli from 99.97%.

### Water at Customers' Taps

5,052 samples were taken from customers' taps and examined for coliforms. Of these, total coliforms were absent from 99.19% of samples and E. coli from 99.92% of samples. 480 samples were taken from customer's taps and examined for Enterococci, and of these Enterococci was absent from all samples.



## Overall Water Quality Total

	Number of Analytical Tests	Number of Tests Exceeding PCV	% Compliance with Regulatory Standards	Number of Tests Exceeding PCV or Authorised Departures	% Compliance with Regulatory Standards including Authorised Departures
<b>Water Leaving Treatment Works</b>					
Total coliforms	9,704	15	99.85	15	99.85
<i>E. coli</i>	9,704	5	99.95	5	99.95
Microbiological Total	19,408	20	99.90	20	99.90
Nitrite	749	1	99.87	1	99.87
<b>Total</b>	<b>20,157</b>	<b>21</b>	<b>99.90</b>	<b>21</b>	<b>99.90</b>
<b>Water in Service Reservoirs</b>					
Total coliforms	17,914	68	99.62	68	99.62
<i>E. coli</i>	17,914	6	99.97	6	99.97
<b>Total</b>	<b>35,828</b>	<b>74</b>	<b>99.79</b>	<b>74</b>	<b>99.79</b>
<b>Water at Customers' Taps or Authorised Supply Points</b>					
Total coliforms	5,052	41	99.19	41	99.19
<i>E. coli</i>	5,052	4	99.92	4	99.92
<i>Enterococci</i>	480	0	100.00	0	100.00
Microbiological Total	10,584	45	99.57	45	99.57
Zone Chemical Analysis	22,966	267	98.84	133	99.42
Supply Point Chemical Analysis	22,509	11	99.95	11	99.95
<b>Total</b>	<b>56,059</b>	<b>323</b>	<b>99.42</b>	<b>189</b>	<b>99.66</b>
<b>Overall Water Quality Total</b>	<b>112,044</b>	<b>418</b>	<b>99.63</b>	<b>285</b>	<b>99.75</b>



### Physical and Chemical Quality

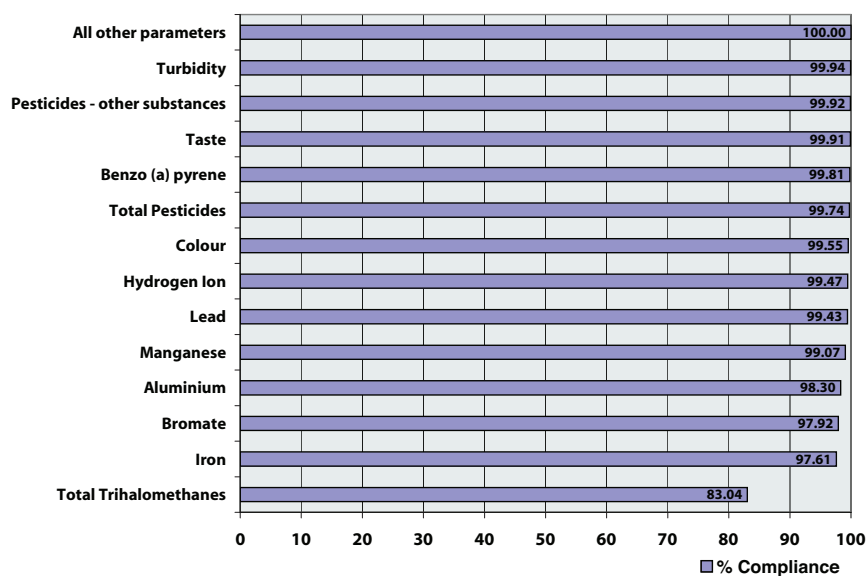
Physical and chemical quality standards apply to water supplied at customers' taps. The Regulations lay down the required sampling frequency for each parameter or group of parameters dependent on the resident population of the water supply zones.

Appendix 3 shows the extent of Water Service's compliance with the regulatory standards at both customer tap and authorised supply point. For most parameters, compliance is judged on the basis of the results of individual samples. If a single sample exceeds the PCV,


that supply is deemed not to comply with the regulatory standards, even if the cause is outside Water Service's control, e.g. defective plumbing within premises. Improved compliance will be achieved through the water treatment works investment programme and thereafter through improvements to the distribution system. Appendix 3 also shows the Mean Zonal Compliance achieved by Water Service for 2006.

- In 2006 a total of 45,197 physical and chemical parameters analysed for, achieved 100% compliance.

**Physical and Chemical Water Quality at Customer Tap  
or Authorised Supply Point  
Mean Zonal Compliance by Parameter**



Explanatory notes of exceedances of the physical and chemical quality standards with less than 100% compliance are provided in the following section.

A close-up, slightly blurred photograph of a waterfall cascading over dark, mossy rocks. The water is white and frothy at the bottom. In the top right corner, there are three thin, curved blue lines that sweep across the frame.

# **Water Quality Issues**

### **Total Trihalomethanes (THMs)**

THMs are chlorination by-products arising from the reaction of chlorine, used for disinfection, with natural organic material present in water. The maintenance of microbiological quality (and hence the use of chlorine) is Water Service's main priority. Northern Ireland waters are predominantly drawn from surface sources, which can contain these organic materials.

The water treatment works investment programme is designed to reduce organic matter prior to chlorination and thereby reduce THM levels. Improved compliance is expected as improvements to water treatment works and distribution system are completed. During 2006 Water Service had a number of unexpected THM failures, particularly in the latter part of the year. This was largely as a result of higher than usual THM levels in zones fed from non-compliant slow sand filter works. These treatment works are being upgraded with new treatment facilities currently under construction. The new works will be in operation late in 2008. In the interim Water Service has carried out remedial work, where possible, to ensure that THM levels in drinking water supplied from these plants are restored to lower levels.

Time limited Authorised Departures for THMs are in place in many of the Water Supply Zones which exceeded the THM regulatory PCV level. During the period of the report, there were 8 exceedances of the Authorised Departure level in these zones, the rest not exceeding the agreed authorised limits.

In the interim until the programmes of work are completed, Water Service is constantly reviewing its

operational procedures with the aim of reducing THM levels in the distribution system, whilst maintaining microbiological quality.

### **Aluminium**

Aluminium can be present in water supplies as a natural constituent due to the nature and structure of the ground from which the supplies are taken. Water supply zones served from the Silent Valley source in the Mourne Mountains have naturally occurring aluminium in their water supplies and the new treatment facilities at Fofanny will lower these levels to below the regulatory standard.

Aluminium compounds are used at some water treatment works as coagulants, for the removal of suspended matter and impurities. The coagulant is subsequently removed, along with the impurities, before the water leaves the treatment works.

The standard set for aluminium is based on aesthetic considerations. A number of water supplies may contain concentrations of aluminium which could exceed the standard from time to time because of changes in raw water quality or treatment process fluctuations. These treatment processes are being reviewed and modified to lower the aluminium levels to below regulatory levels.

Many of the Water Supply Zones which exceeded the aluminium regulatory PCV level have time limited Authorised Departures in place. During the period of the report, there was 1 exceedance of the Authorised Departure level in these zones, the rest falling within the agreed authorised limits.

### **Iron**

The iron standard has been set for aesthetic reasons as levels persistently above the standard can give rise to discoloured water and occurrence of particles. Where the standard for iron has not been met, this may be due to problems of corrosion of cast iron watermain. There is an ongoing programme of scouring and cleaning of the distribution system to minimise the problem. In addition, Water Service has an ongoing Water Mains Rehabilitation Programme in which supply zones that experience water quality and other supply problems are subjected to a detailed zonal study. These detailed zonal studies include the analysis of historic water quality data (including iron) and the implementation of targeted water sampling and analysis programmes to determine the nature and extent of the water quality problems. Appropriate solutions to the problems are then developed which include mains cleaning and renovation and replacement of parts of the distribution system. Implementation of the solutions is undertaken either by Water Service or its contractors.

### **Hydrogen Ion Concentration (pH)**

Hydrogen Ion Concentration (pH) is used as a measure of the acidity or alkalinity of water supplies. In Northern Ireland many upland waters used for water supply contain organic matter derived from peat which is acidic by nature.

The pH of water supplied is adjusted to control the corrosion of watermain and as a preventative measure to reduce the uptake of metals such as lead, copper and zinc from customers' plumbing.



Where the standard for pH has not been met in treated water, this may be related to a problem at a water treatment works, or occasionally from newly installed cement lined water mains in the distribution systems. As water treatment works are upgraded the number of exceedances arising from this source should decrease.

#### **Lead**

Water leaving treatment works and in the distribution systems contains only trace amounts of lead.

However, where lead has been used for service pipes between the watermain and the kitchen tap or for domestic plumbing, there may be a risk of concentrations at the customers' tap exceeding the lead standard.

Many older properties still have service pipes and internal plumbing wholly or partly comprised of lead. If a sample is found to exceed the

limit for lead in drinking water, both the customer and the local Environmental Health Officer are notified. Water Service will replace free of charge, any of its lead pipes supplying a property, if it receives a written request from a customer who has replaced the portion of lead service pipe for which the householder is responsible. A leaflet on lead in drinking water "Have you got lead pipes?" is available, free of charge, from Water Service's Customer Service Units.

The majority of supplies in Northern Ireland are now being treated with orthophosphoric acid to minimise levels of lead in the water supply.

The Water Mains Rehabilitation Programme detailed Zonal studies referred to earlier includes sampling and testing for lead and aims to identify the presence of lead communication pipes in a zone. Also, where water mains are being

rehabilitated, Water Service requires any lead communication pipes encountered to be replaced to the edge of the property.

#### **Manganese**

Manganese occurs naturally in many water sources.

Concentrations can vary seasonally or be attributed to the disturbance of accumulated deposits at the bottom of reservoirs when the water is drawn down or when water circulation occurs. The standard for manganese has been set for aesthetic reasons to prevent unpleasant tastes, staining or discoloured water.

#### **Pesticides**

Pesticides include insecticides, herbicides, fungicides and algaecides. These can find their way into watercourses from a variety of sources, mainly from use in agriculture or weed control. Water Service has an ongoing pesticide



monitoring programme and currently analyses samples for 48 individual pesticides. Water Service constantly liaises with other regulatory bodies in Northern Ireland such as Environment and Heritage Service regarding pesticide usage and control.

The pesticide exceedances were for some of the more commonly used pesticides – in particular MCP (Mecoprop) at Lough Cowey WTW. Water Service has been granted an authorised departure for MCP prior to its supplying the area from a compliant WTW and the planned decommissioning of this works.

Water Service is engaged on an ongoing series of catchment management plans which include looking at pesticide usage and control.

#### **Turbidity**

Particulate matter, usually the re-

suspension of sediments present in the distribution system, affects the turbidity of drinking water. Systematic flushing of the local pipe work usually restores water quality.

#### **Bromate**

The sole UK manufacturer of sodium hypochlorite began using a different rock salt which contained higher than normal levels of bromate. Bromate exceedances of the regulatory limit were reported across the UK Water Industry and following discussions with the DWI the industry, as a whole, has now moved to a low bromate product.

#### **Taste**

If water has been standing in pipework for some hours it may have a flat or stale metallic taste. 2 samples examined for taste in 2006 exceeded the PCV limit.

Subsequent resamples proved to be negative.

#### **Polycyclic Aromatic Hydrocarbons (PAHs)**

PAHs including Benzo (a) pyrene are organic compounds that can occur in drinking water due to the deterioration of coal tar linings, which were used in the past to protect iron watermains from corrosion. The ongoing watermains rehabilitation programme will continue to address this.

#### **Other Parameters**

Several exceedances were recorded for colour. These were investigated and no repeat exceedances were recorded.

#### **Summary**

Exceedances of the regulatory standard are investigated following procedures agreed with the Health Authorities and the Drinking Water Inspectorate. Closure of an event cannot take place without their approval.



# Investing for the Future

## Water Treatment and the Distribution System

During the period of this report work continued on the on-going programme of improvements to our Water Treatment Works (WTW). Water Service has completed the replacement of the existing Fofannybane WTW located in the Mourne Mountains, close to the Fofanny Dam and the improvements to Carron Hill WTW / Lough Ross close to Crossmaglen. In addition, the contract to improve the treatment process at Clay Lake WTW which serves Keady and the surrounding area has been continuing during 2005 and 2006 with supply of water into the system anticipated in May 2007.

Water Service also continued with its detailed studies of the watermain network system throughout Northern Ireland. Twenty one construction contracts resulting from these studies have been commenced. Two were completed in 2005 and 11 in 2006. This work is improving the watermain network system at locations throughout the province. Depending on the availability of funding, these detailed studies will feed further extensive watermain rehabilitation contracts into the work programme over the next 9 to 12 years.

Expenditure on the trunk and distribution watermain network continued throughout the year, including work on the Newcastle Trunk Main, which was commissioned in August 2006.

This main transfers water to the new Newcastle Service Reservoir at Tullybrannigan and provides security of supply to the Newcastle, Downpatrick and Clough areas. Construction of the Dunore to Hyde Park Pumping main was commenced in 2006 and this pipe supplied its first water to Belfast in December 2006. The provision of new or replacement distribution watermains continued to take place across Northern Ireland.

Work continued throughout the year to implement the recommendations of the Water Resource Strategy. The Strategy provides Water Service with a robust basis for the development and management of secure and sustainable water resources in Northern Ireland.

Work has commenced on a third asset management plan (NIAMP3) which is planning to deliver a draft

business plan to the Regulator in autumn 2008 and a strategic business plan in early 2009.

Water Service's programming of improvements is dependent on the level of funding it receives. The current status of Water Service's water treatment investment for water quality improvements is set out in Appendix 4.

## Research and Development

Water Service through its Asset Management R&D section undertakes a programme of applied research and technology development to support the development of standards and best practice and promote technical innovation. This programme is driven by the need to improve quality, whilst making efficiency gains, and contains several projects aimed at improving our compliance with drinking water quality standards and consented discharges, service to our customers and protecting the environment. Examples of this work are as listed below in the UKWIR and WRc projects.

Water Service is a member of United Kingdom Water Industry Research Ltd. (UKWIR), an organisation that provides a framework for the procurement of a common research programme for UK water operators on "one-voice" issues. Projects undertaken by UKWIR include research in such areas as:

- Climate Change
- Developing a framework for drinking water safety plans
- Customer Issues
- Regulation
- Environment & Quality
- Drinking Water
- Sewage Sludge

Water Service participates with other utilities in a programme of collaborative research managed by WRc. This programme covers a wide range of topics including:

- Asset Management
- Leakage
- Sewerage
- Drinking Water Quality
- Wastewater treatment.
- Sustainability
- Climate change

The R&D section also supports our business in other areas such as identifying appropriate treatment processes and development of strategy to ensure consistency and standardisation across a range of business activities.

Through identifying and facilitating workshops, dissemination of research outputs and updates the section informs directors and managers of current technological developments, best practice and current industry research areas. The section also manages projects which use applied research and industry consultants to provide expertise to bridge knowledge gaps and solve problems specific to NIW.

Through the R&D section Water Service collaborated with and supported local and other UK university research projects and we are members of Queens University Environmental Science and Technology Research Centre (QUESTOR).

# Public Information





### **Drinking Water Register**

A Drinking Water Register is maintained recording detailed water quality results for each water supply zone.

The Register is available for inspection, free of charge, during normal working office hours at the customer relations centre below. Customers can examine any record on the register and obtain a free copy of the information for the water supply zone they live in. A charge may be made for printed information on other zones.

Customers, who wish to receive information about the quality of water in their water supply zone by post, can write to the address listed below:

**Customer Relations Centre  
4th Floor  
Capital House  
3 Upper Queen St  
Belfast BT1 6PU**

Customers can alternatively contact the Customer Relations Centre on: 08457 440088

There is also a text number for customers who have hearing difficulties: 08457 023206

Calls to these numbers are charged at the local rate.

Customers may also contact Customer Services by email on: [waterline@niwater.com](mailto:waterline@niwater.com)

Further information for customers may be obtained at the following website: <http://www.niwater.com>

This site also contains electronic versions of recent Water Quality reports.

### **Customer Services**

Staff in the Customer Relations Centre record details and the nature of all enquiries, requests for services, emergencies and complaints. All enquiries etc. are logged and routed directly to staff who will investigate the matter and resolve the problem as quickly as possible.

Customer Services produces a range of leaflets about services provided, including those designed to give customers the opportunity to learn more about water quality standards, water efficiency and the need to use water wisely. The leaflets can be obtained from the Customer Relations Centre or may be viewed on the above Website.

To assist its visually impaired customers, a Braille version of this report is also prepared.

## Appendix 1 Drinking Water Quality Standards

### SCHEDULE 1 PRESCRIBED CONCENTRATIONS AND VALUES

**TABLE A.  
MICROBIOLOGICAL PARAMETERS**

Part I: Directive requirements			
<i>Parameters</i>	<i>Concentration or Value (maximum)</i>	<i>Units of Measurement</i>	<i>Point of compliance</i>
<i>Enterococci</i>	0	number/100ml	Customers' taps
<i>Escherichia coli (E. coli)</i>	0	number/100ml	Customers' taps
Coliform bacteria	0	number/100ml	Customers' taps (i)

**TABLE B.  
CHEMICAL PARAMETERS**

Part I: Directive requirements			
<i>Parameters</i>	<i>Concentration or Value (maximum)</i>	<i>Units of Measurement Measurement</i>	<i>Point of compliance</i>
Acrylamide	0.10	µg/l	(ii)
Antimony	5	µg Sb/l	Customers' taps
Arsenic	10	µg As/l	Customers' taps
Benzene	1	µg/l	Customers' taps
Benzo (a) pyrene	0.01	µg/l	Customers' taps
Boron	1	Mg B/l	Customers' taps
Bromate	10	µg BrO3/l	Customers' taps
Cadmium	5	µg Cd/l	Customers' taps
Chromium	50	µg Cr/l	Customers' taps
Copper	2	Mg Cu/l	Customers' taps
Cyanide	50	µg Cn/l	Customers' taps
1,2 Dichloroethane	3	µg/l	Customers' taps*
Fluoride	1.5	Mg F/l	Customers' taps
Lead	(a) 25, from 25th December 2003 until immediately before 25th December 2013	µg Pb/l	Customers' taps
	(b) 10, on and after 25th December 2013	µg Pb/l	Customers' taps
Mercury	1	µg Hg/l	Customers' taps
Nickel	20	µg Ni/l	Customers' taps
Nitrate	50	Mg NO3/l	Customers' taps

<i>Parameters</i>	<i>Concentration or Value (maximum)</i>	<i>Units of Measurement Measurement</i>	<i>Point of compliance</i>
Nitrite	0.5	Mg NO <sub>2</sub> /l	Customers' taps
Aldrin	0.03	µg/l	Customers' taps*
Dieldrin	0.03	µg/l	Customers' taps*
Heptachlor	0.03	µg/l	Customers' taps*
Heptachlor epoxide	0.03	µg/l	Customers' taps*
Other pesticides	0.1	µg/l	Customers' taps*
Total Pesticides (iii)	0.5	µg/l	Customers' taps*
PAH - Sum of four substances (iv)	0.1	µg/l	Customers' taps
Selenium	10	µg Se/l	Customers' taps
Tetrachloroethene/ Trichloroethene – Sum (v)	10	µg/l	Customers' taps*
Total Trihalomethanes (vi)	100	µg/l	Customers' taps
Vinyl chloride	0.50	µg/l	(ii)

Notes:

**(i)** Water Service, with the agreement of the Drinking Water Inspectorate, includes Total Coliforms within the Part I: Directive Requirements table for statistical purposes.

**(ii)** The parametric value refers to the residual monomer concentration in the water as calculated according to specifications of the maximum release from the corresponding polymer in contact with the water. This is controlled by product specification.

**(iii)** Total Pesticides: means the sum of the concentrations of the individual pesticides detected and quantified in the monitoring procedure.

**(iv)** The specified compounds are:

- benzo(b)fluoranthene
- benzo(k)fluoranthene
- benzo(ghi)perylene
- indeno (1,2,3-cd) pyrene.

**(v)** The parametric value applies to the sum of the concentrations of the individual compounds detected and quantified in the monitoring process.

**(vi)** The specified compounds are:

- chloroform
- bromoform
- dibromochloromethane
- bromodichloromethane

\* May be monitored from samples of water leaving treatment works or other supply point, as no significant change during distribution.

Part II: National requirements			
Parameters	Concentration or Value (maximum unless otherwise stated)	Units of Measurement	Point of compliance
Aluminium	200	µg Al/l	Customers' taps
Colour	20	mg/l Pt/Co	Customers' taps
Hydrogen ion	10	pH value	Customers' taps
	6.5 (minimum)	pH value	
Iron	200	µg Fe/l	Customers' taps
Manganese	50	µg Mn/l	Customers' taps
Odour	3 at 25°C	Dilution number	Customers' taps
Sodium	200	mg Na/l	Customers' taps
Taste	3 at 25°C	Dilution number	Customers' taps
Tetrachloromethane	3	µg/l	Customers' taps
Turbidity	4	NTU	Customers' taps

## SCHEDULE 2 INDICATOR PARAMETERS

Parameters	Specification Concentration or Value (maximum) or State	Units of Measurement	Point of monitoring
Ammonium	0.5	mg NH <sub>4</sub> /l	Customers' taps
Chloride (i)	250	mg Cl/l	Supply point*
<i>Clostridium perfringens</i> (including spores)	0	Number/100ml	Supply point*
Colony counts	No abnormal change	Number/1 ml at 22°C Number/1 ml at 37°C	Customers' taps, service reservoirs and treatment works
Conductivity (i)	2500	µS/cm at 20°C	Supply point*
Hydrogen ion	9.5	pH value	Customers' taps
Sulphate (i)	250	mg SO <sub>4</sub> /l	Supply point*
Total indicative dose (for radioactivity) (ii)	0.1	mSv/year	Supply point*
Total organic carbon (TOC)	No abnormal change	mg C/l	Supply point*
Tritium (for radioactivity)	100	Bq/l	Supply point*
Turbidity	1	NTU	Treatment work

Notes:

(i) The water should not be aggressive.

(ii) Excluding tritium, potassium-40, radon and radon decay products.

\* May be monitored from samples of water leaving treatment works or other supply point, as no significant change during distribution.

### Explanatory Notes

#### Measurement Units:

mg/l means one part in a million. µg/l means one part in a thousand million.

#### Parameter:

A parameter refers to any substance, organism or property listed above.

## Appendix 2

### Year 2006 Authorised Departures by Water Supply Zones under Regulation 37

Zone Code	Zone Name	Aluminium (µg/l)	Total Trihalomethanes (µg/l)	Authorised Departure Start	Authorised Departure End
Z104	Ballymena Borough	—	150	01-Jan-04	31-Dec-06
Z109	Dunore North	—	150	01-Jan-04	31-Dec-06
Z112	Mormeal	—	150	01-Jan-04	31-Dec-06
Z113	Moyola	—	150	01-Jan-04	31-Dec-06
Z116	Unagh	—	150	01-Jan-04	31-Dec-06
Z201	Altmore	300	200	01-Jan-04	31-Dec-06
Z202	Altmore-Gortlenaghan	300	200	01-Jan-04	31-Dec-06
Z208	Castor Bay	—	200	01-Jan-04	31-Dec-06
Z209	Castor Bay-Shanmoy	—	200	01-Jan-04	31-Dec-06
Z210	Clay Lake	—	150	08-Sep-06	30-Nov-07
Z211	Fofanny-Ballymaconaghy	400	250	01-Jan-04	31-Dec-06
Z212	Fofanny-Banbridge	400	250	01-Jan-04	31-Dec-06
Z213	Fofanny-Newry	400	250	01-Jan-04	31-Dec-06
Z214	Lough Ross	—	250	01-Jan-04	31-Dec-06
Z217	Newry	400	250	01-Jan-04	31-Dec-06
Z218	Richhill	—	200	01-Jan-04	31-Dec-06
Z219	Seagahan	—	250	01-Jan-04	31-Dec-06
Z220	Silent Valley South	400	250	01-Jan-04	31-Dec-06
Z221	Banbridge-Babylon Hill	—	200	01-Jan-04	31-Dec-06
Z222	Ballydugan-Ballyhannon	—	200	01-Jan-04	31-Dec-06
Z223	Lurgan-Magheraliskmisk	—	200	01-Jan-04	31-Dec-06
Z309	Dunmurry	—	200	01-Jan-04	31-Dec-06
Z310	Dunore East	—	150	01-Jan-04	31-Dec-06
Z311	Holywood	—	150	01-Jan-04	31-Dec-06
Z312	Kilkeel/Annalong	400	250	01-Jan-04	31-Dec-06
Z314	Lisburn North	—	200	01-Jan-04	31-Dec-06
Z316	Lough Cowey	—	150	01-Jan-04	31-Dec-06
Z318	Oldpark	—	250	01-Jan-04	31-Dec-06
Z320	Stoneyford	—	200	01-Jan-04	31-Dec-06
Z321	Woodvale	—	150	01-Jan-04	31-Dec-06

### Programmes of Work to meet Authorised Departure Requirements

During 2006, certain planned and remedial programmes of work to meet Authorised Departure requirements were completed. These were:

Water Treatment Works	Zone code affected	Zone name affected
Fofanny WTW	Z212	Fofanny-Banbridge
	Z213	Fofanny-Newry
	Z217	Newry
	Z220	Silent Valley South
	Z312	Kilkeel-Annalong
Carron Hill WTW	Z214	Lough Ross

### Appendix 3

#### Water Quality Report for Water Supply Zones

Schedule 1 parameters	2006 Samples	No. > PCV	% > PCV	No. > AD	% > AD
<i>Enterococci</i>	480	0	0.00%	—	—
<i>E. coli</i>	5052	4	0.08%	—	—
Aluminium	2016	36	1.79%	1	0.05%
Antimony	480	0	0.00%	—	—
Arsenic	480	0	0.00%	—	—
Benzo (a) pyrene	480	1	0.21%	—	—
Bromate	480	10	2.08%	—	—
Cadmium	480	0	0.00%	—	—
Chromium	480	0	0.00%	—	—
Colour	1928	7	0.36%	—	—
Copper	478	0	0.00%	—	—
Hydrogen Ion	1928	4	0.21%	—	—
Iron	1928	45	2.33%	—	—
Lead	480	3	0.63%	—	—
Manganese	1928	8	0.41%	—	—
Nickel	480	0	0.00%	—	—
Nitrate	496	0	0.00%	—	—
Nitrite	496	0	0.00%	—	—
Odour	1928	0	0.00%	—	—
Selenium	480	0	0.00%	—	—
Sodium	480	0	0.00%	—	—
Taste	1928	2	0.10%	—	—
PAH - Sum of four substances	480	0	0.00%	—	—
Total Trihalomethanes	704	150	21.31%	8	1.14%
Turbidity	1928	1	0.05%	—	—

Indicator parameters	2006 Samples	No. > SPEC	% > SPEC
Total Coliforms	5052	41	0.81%
Total - Residual disinfectant	5052	0	0.00%
Free - Residual disinfectant	5052	0	0.00%
Colony Counts 37 (48hrs)	1928	0	0.00%
Colony Counts 22	1928	0	0.00%
Hydrogen Ion (indicator) pH value	1928	0	0.00%
Ammonium	1928	1	0.05%

## Water Quality Report for Authorised Supply Points

Schedule 1 parameters	2006 Samples	No. > PCV	% > PCV	No. > AD	% > AD
Benzene	402	0	0.00%	—	—
Boron	402	0	0.00%	—	—
Cyanide	402	0	0.00%	—	—
1,2 Dichloroethane	402	0	0.00%	—	—
Fluoride	399	0	0.00%	—	—
Mercury	402	0	0.00%	—	—
Aldrin	402	0	0.00%	—	—
Dieldrin	402	0	0.00%	—	—
Heptachlor	402	0	0.00%	—	—
Heptachlor Epoxide	402	0	0.00%	—	—
Total Pesticides	402	1	0.25%	—	—
All other analysed Pesticides	17286	10	0.06%	—	—
Tetrachloroethene/Trichloroethene - Sum	402	0	0.00%	—	—
Tetrachloromethane	402	0	0.00%	—	—

Indicator parameters	2006 Samples	No. > SPEC	% > SPEC
Clostridium perfringens	3157	25	0.79%
Chloride	399	0	0.00%
Conductivity	3194	0	0.00%
Sulphate	399	0	0.00%
Total Organic Carbon	398	0	0.00%
Total Indicative Dose	402	0	0.00%
Tritium	402	0	0.00%

## Water Quality Report for Water Treatment Works

Schedule 1 parameters	2006 Samples	No. > PCV	% > PCV
<i>Total Coliforms</i>	9704	15	0.15%
<i>E. coli</i>	9704	5	0.05%
Nitrite	749	1	0.13%
Turbidity	9703	114	1.17%
Total - Residual disinfectant	9704	0	0.00%
Free - Residual disinfectant	9704	0	0.00%
Colony Counts 37 (48hrs)	9704	0	0.00%
Colony Counts 22	9704	0	0.00%

### Water Quality Report for *Cryptosporidium* Oocysts

Parameter	2006 Samples	No. > Reporting Level	% > Reporting Level
<i>Cryptosporidium</i> Oocysts	1137	0	0.00%

### Water Quality Report for Service Reservoirs

Schedule 1 parameters	2006 Samples	No. > PCV	% > PCV
Total Coliforms	17914	68	0.38%
<i>E. coli</i>	17914	6	0.03%
Colony Counts 22	17914	0	0.00%
Colony Counts 37 (48hrs)	17914	0	0.00%
Total - Residual disinfectant	17914	0	0.00%
Free - Residual disinfectant	17914	0	0.00%



## 2006 Mean Zonal Compliance

Parameter	Number of Samples	No. of fails at zone / supply point	No. of zones / supply points with fails	% Zonal Compliance
Colour	1928	7	7	99.55
Turbidity	1928	1	1	99.94
Odour	1928	0	0	100.00
Taste	1928	2	2	99.91
Hydrogen Ion	1928	4	4	99.47
Sodium	480	0	0	100.00
Nitrate	496	0	0	100.00
Nitrite	496	0	0	100.00
Nitrite/Nitrate Formula	496	0	0	100.00
Aluminium	2016	36	11	98.30
Iron	1928	45	20	97.61
Manganese	1928	8	6	99.07
Copper	478	0	0	100.00
Fluoride	399	0	0	100.00
Arsenic	480	0	0	100.00
Cadmium	480	0	0	100.00
Cyanide	402	0	0	100.00
Chromium	480	0	0	100.00
Mercury	402	0	0	100.00
Nickel	480	0	0	100.00
Lead	480	3	2	99.43
Antimony	480	0	0	100.00
Selenium	480	0	0	100.00
Pesticides - total substances	402	1	1	99.74
Total PAH (sum of 4 substances)	480	0	0	100.00
<i>E. coli</i>	5052	4	3	99.96
<i>Enterococci</i>	480	0	0	100.00
Boron	402	0	0	100.00
Benzo (a) pyrene	480	1	1	99.81
Tetrachloromethane	402	0	0	100.00
Tetrachloroethene/Trichloroethene - Sum	402	0	0	100.00
Total Trihalomethanes	704	150	30	83.04
1,2 Dichloroethane	402	0	0	100.00
Benzene	402	0	0	100.00
Bromate	480	10	5	97.92
Aldrin	402	0	0	100.00
Dieldrin	402	0	0	100.00
Heptachlor	402	0	0	100.00
Heptachlor epoxide	402	0	0	100.00
Pesticides - other substances (P999)	17286	10	6	99.92
<b>Total Number of Samples / Fails</b>	<b>51503</b>	<b>282</b>		
<b>Mean Zonal Compliance %</b>				<b>99.34</b>

## Appendix 4 Investment Programme

Over the last ten years improvement work has been completed at the following water treatment works:

Altnahinch WTW	Ballysallagh WTW	Carmonney WTW	Caugh Hill WTW
Derg WTW	Drummaroad WTW	Dungonnel WTW	Killyhevlin WTW
Lough Bradan WTW	Lough Fea WTW	Lough Macrory WTW	Rathlin Island WTW
Woodburn WTW			

In 2006 Water Service completed the construction and commenced the operation of:

Fofanny WTW	Carron Hill WTW
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Construction commenced in June 2006 on improvements at:

Ballinrees WTW	Dunore Point WTW	Moyola WTW	Castor Bay WTW
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and it is anticipated that by May 2007 supply will commence from the improved Clay Lake WTW.

Improvement work at Seagahan WTW is programmed to commence in 2007, with work planned for Lough Bradan WTW to commence in 2008 and Carmonney WTW in 2009.

As the programme for improvement / replacement of WTWs nears completion Water Service is shifting the emphasis of upgrading work into the distribution system:

- Newcastle Trunk Water Main was commissioned in August 2006;
- North Down Strategic Water Main commenced in Dec 2005 is due for completion in late 2007;
- Dunore to Hyde Park Pumping Main Replacement commenced construction in 2006 and has been supplying water since December 2006 although some work remains to be done in 2007 before final completion;
- Ballinrees to Limavady Water Main is programmed to commence in Feb 2007;
- Ballinrees to Ballymoney Water Main is programmed to commence in Feb 2007; and
- Castor Bay to Forked Bridge Water Main is programmed to commence in Feb 2007.

Work is planned for the rehabilitation of pipe work in more than 90 rehabilitation zones throughout the province. Construction is in progress at 21 of these zones. Three zones commenced in 2004, 14 zones commenced in 2005, 4 in 2006 and subject to available funding the remainder will follow as the programme develops.

Alongside the rehabilitation programme upgrading of water pipe work through framework contracts includes 154 projects at construction stage during 2006. Thirty of these were commenced before 2006, 124 commenced in 2006 and 143 were completed in 2006.

## Appendix 5

### Glossary of Technical Terms


<b>Aesthetic</b>	Associated with the senses of taste, smell and sight.
<b>Authorised Departure (AD)</b>	A time limited authorised departure from the regulatory limit for certain parameters, provided that there is a planned programme of work at the water treatment works to improve the water quality and that there are no adverse health implications.
<b>Authorised Supply Point</b>	A sampling point within the distribution system authorised by the DWI for certain parameters, because the results of the analysis of such samples are unlikely to differ in any material respect from the results of the analysis of samples taken from customers' taps.
<b>Catchment</b>	The area of land that drains into a watercourse.
<b>Chloramination</b>	An alternative form of disinfectant, based on chlorine and ammonia, which provides a longer lasting residual disinfectant in the distribution system compared to free chlorine.
<b>Coagulation</b>	The process of aggregating colloidal and fine particulate matter into a settleable material.
<b>Coliforms</b>	A group of bacteria which may be faecal or environmental in origin.
<b>Compliance assessment</b>	A comparison made by the DWI of data (gathered by Water Service) against standards and other regulatory requirements.
<b>Contravention</b>	A breach of the regulatory requirement.
<b>Cryptosporidiosis</b>	The illness produced by infection with <i>Cryptosporidium</i> .
<b><i>Cryptosporidium</i></b>	A protozoan parasite.
<b>Determination</b>	A single analytical result for a specific parameter.
<b>Distribution systems</b>	Water Service's network of mains, pipes, pumping stations and service reservoirs through which treated water is conveyed to customers.
<b>Drinking Water Directive</b>	European Council Directive (98/83/EC) relating to the quality of water intended for human consumption.

<b>DWI</b>	Northern Ireland Drinking Water Inspectorate - has an independent responsibility to audit drinking water quality compliance against the standards set in the Regulations.
<b>Event</b>	A situation affecting or threatening to affect drinking water quality.
<b>Exceedance</b>	Synonym for contravention (see above).
<b>Faecal coliforms</b>	A sub-group of coliforms, almost exclusively faecal in origin.
<b>Filtration</b>	The separation of suspended particulate matter from a fluid.
<b>Groundwater</b>	Water from aquifers or other underground sources.
<b>Hydrogen Ion</b>	A measure of the acidity or basicity related to the concentration of the hydrogen ion (also referred to as pH).
<b>Incident</b>	An event where there has been a demonstrable deterioration in the quality of drinking water.
<b>Investment programme</b>	Investment in improvement works to water treatment works and distribution systems.
<b>Mains rehabilitation</b>	Restoration or replacement of water mains pipework to a proper condition.
<b>Mean Zonal Compliance</b>	The assessment of water quality at a parameter level based on water supply zones.
<b>Microbiological</b>	Associated with the study of microbes.
<b>m<sup>3</sup>/d</b>	Cubic metres per day.
<b>mg/l</b>	Milligrammes per litre.
<b>µg/l</b>	Microgrammes per litre.
<b>ml</b>	Millilitre.
<b>MI/d</b>	Megalitres per day (one MI/d is equivalent to 1,000 m <sup>3</sup> /d or 220,000 gallon/d).
<b>Oocyst</b>	The resistant form in which <i>Cryptosporidium</i> occurs in the environment, and which is capable of causing infection.
<b>Orthophosphoric acid</b>	A chemical dosed in low concentrations at water treatment works to minimise the uptake of lead from old pipework into customers' water.

<b>PAHs</b>	A group of organic compounds known as polycyclic aromatic hydrocarbons, comprising, for the purposes of the Regulations, four substances: benzo(b)fluoranthene, benzo(k)fluoranthene benzo(ghi)perylene and indeno (1,2,3-cd) pyrene,
<b>Parameter</b>	A parameter is any substance, organism or property listed in the regulations.
<b>Pathogen</b>	An organism which causes disease.
<b>PCV</b>	See 'Prescribed concentration or value'.
<b>Pesticides</b>	Any fungicide, herbicide or insecticide or related product (excluding medicines) used for the control of pests or diseases.
<b>Plumbosolvency</b>	The tendency for lead to dissolve in water.
<b>Prescribed Concentration or Value</b>	The numerical value assigned to water quality standards (PCV), defining the maximum or minimum legal concentration or value of a parameter. In certain circumstances, the DWI may authorise a time limited departure from the regulatory value. See 'Authorised Departure'.
<b>Protozoan parasites</b>	A single celled organism that can only survive by infecting a host.
<b>Public register</b>	The information made available by Water Service to the public as required by regulation 34.
<b>Regulations</b>	The Water Supply (Water Quality) Regulations (Northern Ireland) 2002 S.R.No.331 ISBN 0-337-94388-5.
<b>Remedial action</b>	Action taken to improve a situation.
<b>Service reservoir (SR)</b>	A water tower, tank or other reservoir used for the storage of treated water within the distribution system.
<b>Springs</b>	Groundwater appearing at the surface at the outcrop of the junction of an impermeable stratum.
<b>Surface water</b>	Water from rivers, impounding reservoirs or other surface water sources.
<b>Technical audit</b>	The means of checking by the DWI that Water Service is complying with its statutory obligations.
<b>Toxicology</b>	The study of the health effects of substances.



<b>Treated water</b>	Water treated for use for domestic purposes as defined in the Regulations
<b>Trihalomethanes (THMs)</b>	A group of organic substances comprising, for the purposes of the Regulations, four substances: trichloromethane (also known as chloroform), dichlorobromomethane, dibromochloromethane and tribromomethane.
<b>UKAS</b>	The sole national accreditation body recognized by government to assess, against internationally agreed standards, organisations that provide certification, testing, inspection and calibration services.
<b>Water Safety Plan</b>	A means of ensuring that a water supply is safe for human consumption based on a comprehensive risk assessment and risk management approach to all the steps in a water supply chain from catchment to tap.
<b>Water supply zone (Zone)</b>	The basic unit of supply for establishing sampling frequencies, compliance with standards and information to be made publicly available.
<b>Website</b>	Location of information on the Internet. Water Service's website is: <a href="http://www.NIWater.com">http://www.NIWater.com</a>
<b>Wholesomeness</b>	A concept of water quality which is defined by reference to standards and other requirements set out in the Regulations.

The background is a solid blue color with several wavy, horizontal lines in a lighter shade of blue, creating a layered, ocean-like effect.

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**Northern Ireland Water**

Northland House  
3-5 Frederick Street  
BELFAST  
BT1 2NR

T 028 90 244711  
F 028 90 357674  
E [waterline@niwater.com](mailto:waterline@niwater.com)

[www.niwater.com](http://www.niwater.com)



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